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ABSTRACT

The purpose of this study was to determine whether awareness of context provides any of the following: information about letters, words, or phrases which reduces the amount of time needed to identify those items during reading; information leading to more accurate hypothesis-formation; more accurate identification of a largest manageable unit; and information about those letters, words, or phrases that may be skipped entirely. Four experiments were conducted in which college students read sentences after hearing different types of context about those sentences. The same 48 sentences were used in all experiments. Each sentence was nine to thirteen words long, stated a commonly-known fact, and consisted of subject, verb, direct object, and one or two prepositional phrases. There were eight context conditions: subject, verb, direct object, object of preposition, cue to subject, cue to direct object, cue to object of preposition, and no information. In the first experiment, all subjects were tested in all eight context conditions. In experiments two, three, and four, subjects were tested under only four of the conditions. The results indicated that none of the context conditions significantly affected the time needed to process the sentences. (WR)

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Contextual Influences on Sentence Reading

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Introduction

It is now commonly accepted that the skilled reader does not process every letter of every word that he is reading. If reading did involve a letter-by-letter analysis, the highest reading speed possible would be 30-42 words per minute (Kolers, 1970), a rate that is far below the average college student's reading rate of 300 words per minute. Additional evidence against the letter-by-letter account of reading is the fact that spelling errors and misprints frequently go unnoticed by the skilled reader, whose perception of a word is not disrupted by the fact that one letter is missing or wrong.

It appears that the skilled reader, rather than processing every letter on the page, relies on the surrounding context to provide him with some information about the letters and words that appear later on the page. If information about an item is available from context, that item itself does not have to be processed as completely as does an item for which there is no contextual information.

Many studies have confirmed that providing a context (defined as the letters, words, and sentences surrounding other letters, words, and sentences) for materials facilitates processing of these materials (Cofer and Shepp, 1957; Foss, 1969; MacKay, 1966; Miller, 1956; Miller, Bruner and Postman, 1954; Miller and Selfridge, 1950; Morton, 1964 a & b; Tulving and Gold, 1963). Although much of this research has used tasks that differ from normal reading (e.g.,

CS 001 055

recognizing tachistoscopically-presented stimuli, reading material of varying approximations to English), it has been incorporated into current models of reading. While these models all state that context facilitates reading, they differ in their explanations of how context exerts this effect. The explanations that have been proposed include:

(1) Context may provide information about letters, words, or phrases which reduces the amount of time needed to identify those items during reading (Smith, 1971),

(2) Context may provide information leading to more accurate hypothesis-formation (Levin and Kaplan, 1970),

(3) Context may lead to the more accurate identification of a largest manageable unit, or may increase the size of such a unit (Venezky and Calfee, 1970),

(4) Context may provide information about those letters, words, or phrases that may be skipped entirely (Hochberg, 1970; Hochberg and Brooks, 1970).

Purpose

The present experiments represent an attempt to find evidence relevant to the above explanations. It was hoped that the results would either provide evidence in favor of one explanation or allow one or more of the explanations to be ruled out.

Materials and Methods

Four experiments were conducted in which college students read sentences after hearing different types of context about those sentences. The same 48 sentences were used in all experiments. Each sentence was 9 to 13 words long, stated a commonly-known fact,

and consisted of subject, verb, direct object, and one or two prepositional phrases. (Sample sentence: In 1492 Columbus began his first voyage from Spain.)

In the first three experiments, two types of information served as context:

(1) A word actually appearing in the sentence (the subject, the verb, the direct object, or the object of the preposition),

(2) A cue to a word appearing in the sentence (cue to the subject, cue to the direct object, cue to the object of the preposition).

There was also a condition in which S received no information about the sentence; thus, there were eight possible context conditions. For example, the eight conditions for the sentence about Columbus were: (1) Columbus (subject), (2) began (verb), (3) voyage (direct object), (4) 1492 (object of preposition), (5) explorer (cue to subject), (6) journey (cue to direct object), (7) a date (cue to object of the preposition), (8) no information.

In the first experiment, all Ss were tested in all eight context conditions. In Experiments II and III, an incomplete block design was used, in which each S was tested under only four of the context conditions and each condition was presented for 12 sentences in a row.

In Experiment IV, only four context conditions were used: the subject condition, the no information condition, and two longer context conditions. These longer contexts consisted of two sentences, were approximately 30 words long, and were classified as either General (telling generally what the sentence was about) or Specific (giving specific information stated in the sentence). The General

and Specific contexts for the sentence about Columbus were:

General: Portugal would not support Christopher Columbus's plan to reach the east by sailing west. Columbus then went to Spain for help, and eventually succeeded in obtaining that government's support.

Specific: Christopher Columbus first went to Spain with his plan to reach the last by sailing west in 1485. Because of certain Spanish problems, Columbus was not able to set sail until 1492.

In all four experiments, the same procedure for testing the effects of context was used. Before S saw a particular sentence, E supplied him with some contextual information about that sentence. For example, E would say, " 'Columbus' is the subject of the next sentence", or " 'Journey" is a cue to the direct object of the next sentence". The sentence then appeared on a screen in front of S, and he read it silently for meaning, pressing a button when he understood the sentence. Pressing the button caused the sentence to disappear and stopped the timer which recorded to the nearest .01 second the amount of time that the sentence had been displayed. (S's "processing time". The processing times were the primary data used in these experiments.) S was prevented from rehearsing the sentence by reading aloud a series of ten letters which flashed briefly on the screen. He then reported the meaning of the sentence to E, who wrote down his report verbatim. E then pressed a button which caused the number of points S had earned for that sentence to be displayed. S could earn either 0, 2, 4, 6, or 8 points per sentence, with more points being earned for faster reading times. If

S had reported the sentence meaning correctly, he saw only the number of points he had earned. If, however, he failed to report the meaning correctly, he saw the number of points plus a red light, indicating that he had forfeited the points for that sentence. Thus, for every sentence, S received feedback about both his speed of reading and his accuracy of reporting. After S saw the points for the sentence he had just read, E told him the context for the next sentence, which then appeared on the screen for S to read. At the end of the experiment, S was paid cash according to how many points he had accumulated for all 48 sentences.

Before the start of the experiment, the payoff system was explained to S, and he went through the procedure with two practice sentences. E stressed that S should read and report the meaning of the sentence, that verbatim recall was not required. If S gave a verbatim report of the practice sentences, E suggested other ways that the sentence could have been reported correctly.

This type of payoff procedure has been used successfully in prior research on sentence processing (Winter and McConkie, in preparation). Under these payoff conditions, Ss read at a pace close to normal reading speed (276 words per minute); without a payoff, Ss read much more slowly (96 words per minute). Also, while this procedure does differ from normal, everyday reading, it is more similar to normal reading than are many of the tasks that have been used to study the effects of context, i.e., the stimuli were meaningful sentences; S controlled his own reading speed; that speed was close to normal reading speed; S's reading was silent; he read for meaning rather than for verbatim recall.

Results

Analyses of variance were performed on the processing time data for all experiments. These analyses showed that none of the context conditions significantly affected the time needed to process the sentences. The Ss made very few errors in reporting the sentences, and the errors made were not related to the context conditions.

Discussion

The results from these experiments seem to call into questions the first three explanations for the effects of context listed on Page 2. If any, or all, of these three explanations were correct, the contexts used in the present experiments should have led to faster processing times. Explanation 4 is not questioned by the present studies because the nature of the task precluded S from skipping parts of the sentences. Although the sentences did not have to be reported verbatim, all parts of the sentence had to be included in some form for the report to be judged correct. During normal reading, the reader can decide for himself whether or not certain items are important for him to read, but in the present studies this decision was taken away from him. He knew that all items had to be processed. Thus, even though context provided him with some knowledge of a sentence item, or of the entire sentence, he could not afford to actually skip entirely any of the items.

The fact that the requirements of the present experimental task prevented the Ssfrom being able to skip parts of the sentences demonstrates that the role of context may vary as the reader's purpose varies. Research has shown that readers can read for different purposes if instructed to do so (McConkie, Rayner and Wilson, 1973),

and the reader's purpose undoubtedly affects what, and how much, use he makes of context. If the task calls for rather precise recall of the information being read, the reader may read everything fairly carefully and not rely on context to enable him to read faster. On the other hand, if he is reading something that does not have to be recalled precisely, he can use context to guide his decisions about what can be skipped and thus he can read more quickly. There are even situations in which context can increase the time needed to comprehend a sentence. Dooling (1971, 1972) has shown that if the task specifically calls for a strategy of integrating the context meaning with the sentence meaning, then presenting a context leads to longer comprehension times.

Further research is needed to determine whether context does in fact operate by enabling readers to skip information. For example, readers' eye movements could be studied to determine what, if any, information is skipped, and if the type of information skipped varies as the reading material and the task vary. Such research will help lead to more precise reading models, and may provide information that is useful in the teaching of efficient reading. One of the results of more extensive research on contextual effects may be the realization that one reading model cannot be used to explain all the different kinds of reading that occur.

[1] Paper presented at American Educational Research Association annual meeting, Chicago, April 16, 1974. Research conducted at Cornell University.

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